

5138

Diag. Cht. No. 1001-2

Form 504 Ed. June, 1928	
DEPARTMENT OF COMMERCE U. S. COAST AND GEODETIC SURVEY R. S. Patton., Director	
State: <u>Florida</u>	
DEC 23 1931	
DESCRIPTIVE REPORT	
Topographic Hydrographic	} Sheet No. 5138 Field #3
LOCALITY	
<u>East Coast</u>	
<u>Southeast of Cape Canaveral</u>	
1931	
CHIEF OF PARTY	
<u>G. D. Cowie</u>	

U. S. GOVERNMENT PRINTING OFFICE: 1930

5138

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

REG. NO. 5138

The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. 3

REGISTER NO. 5138

State Florida

General locality East Coast

Locality Southeast of Cape Canaveral

Scale 1:120,000 Date of survey Feb. 24 - March 25, 1931

Vessel Str. LYDONIA + GILBERT

Chief of Party George D. Cowie

Surveyed by George D. Cowie

Protracted by L. S. Hubbard

Soundings penciled by L. S. Hubbard

Soundings in fathoms ~~1000~~

Plane of reference Mean low water

Subdivision of wire dragged areas by

Inked by

Verified by

Instructions dated January 5, 1931, 19

Remarks:

5 Vols.
1000 Rpt.
1 Title Sheet
1 Rpt.

DESCRIPTIVE REPORT

to accompany

HYDROGRAPHIC SHEET NO. 3

U S COAST & GEODETIC SURVEY
LIBRARY AND ARCHIVES

DEC 22 1931

Acc. No. _____

Project No. 72

Florida East Coast

Scale - 1:120000

U.S.C.&G.S.S. LYDONIA

George D. Cowie,
Chief of Party.

DESCRIPTIVE REPORT

HYDROGRAPHIC SHEET No. 3

Project No. 72

Instructions from the Director dated
January 5, 1931

LOCATION AND LIMITS OF SURVEY

This sheet covers the offshore area southeast of Cape Canaveral from the twenty fathom curve to depth of about 250 fathoms at parallel $79^{\circ}-47'$; and from latitude $28^{\circ}-00'$ to latitude $28^{\circ}-40'$. Its inshore limit joins the work done on field sheets #1 and #2, ⁵¹²⁰Steamer LYDONIA, season of 1931, its northern limit overlaps the work on the offshore sheet, ⁴⁹³¹Steamer LYDONIA, season of 1930, and its southern limit overlaps the work of the offshore sheet, ⁵⁰²⁹Steamer RANGER, season of 1930.

SURVEY METHODS

Floating signals were used for the initial control of this survey. A line of buoys about three miles apart was planted in longitude $80^{\circ}-08'$, extending from latitude $27^{\circ}-55'$ northward to latitude $28^{\circ}-32'$. The position of the buoys was obtained by double log runs and sun azimuths between buoys. The buoys from "IZZY" to "ARAB" were on field sheets #1 and #2 and the positions of these buoys were transferred from these sheets. The buoy line "ARAB" to "WAKE" was carried from "ARAB" northward by double log runs and sun azimuths.

Visual sextant fixes were used for position control to the outer limit of visibility of the buoys. Beyond the limit of visibility precise dead reckoning loops were run. At the same time bomb distances and radio bearings to the M.V. GILBERT, stationed at some buoy, were attempted. Bombs failed to carry beyond about 10 miles or beyond depths greater than 60 fathoms*, and the radio bearings were not sharp enough for survey control. Most dependence therefore was placed on the precise dead reckoning.

* 94A gives a bomb return in ^{about} 100 faths. (2)

During precise dead reckoning runs, readings of the taffrail logs and of the propellor revolution counter were taken every three minutes. The factors for these logs and the revolutions of the ship's propellor were obtained by log tests over a precisely measured range south of Cape Canaveral Bight, at the beginning and end of the season.

In addition, during precise dead reckoning runs, the ship's heading by standard compass was read every minute. The headings were averaged for the time the ship was on a given course. Ship swings were made at the beginning and at the end of the season, the later swing with the starboard boom swung out. Because the starboard sounding boom was swung out during the dead reckoning runs, the deviations determined while this boom was swung out were used on all sounding days, except the first, February 24th.

The #412, hammer type, fathometer was used for sounding in depths from 20 fathoms to 100 fathoms. In greater depths the oscillator type of fathometer was used.

Soundings obtained by the hammer type fathometer were compared with hand lead soundings at the beginning and end of each loop, and the corrections applied to the soundings taken between the comparisons. Near depths of 100 fathoms both fathometers were set in operation and the soundings on the oscillator type compared with those of the hammer type for correction.

The initial flash on the hammer type of fathometer was subject to shifting and required watching.

SOUNDINGS

Soundings were corrected for tide to the 100 fathom curve. Beyond that fathometer soundings were corrected for the salinities and temperatures of the water, and for the index error obtained by comparison with hand lead or other fathometer. The index corrections were considered to vary directly with the time between succeeding determinations of the index corrections.

DISCREPANCIES

Bomb Distances

The bomb distances in many cases were greater than the distances by visual fix or precise deadreckoning. Lieut. C. A. Burmister has suggested the following cause. If the filament of the

thyrotron on the automatic key circuit was not heated long enough before the arrival of the impulse, the tripping of the key would not be instantaneous. Similar action is noticed in the fathometer circuit in that the red light does not begin to flash until 10 or 15 seconds after the apparatus has been started. Inasmuch as the bomb distances were of the order of 5 to 15 seconds, this short interval between the exploding of the bomb with immediate throwing of the key circuit switch and the reception of the impulse, would cause this delayed action on this survey, but would not be effective on surveys where the ship was farther from the hydrophone station and the bomb interval greater than 15 seconds.

Soundings

After adjusting the sounding lines, the depths at the crossings agreed fairly well except at two places. The line 84H to 85H fails to check the line 40H to 41H at the point of crossing by eight fathoms.

The soundings on line 93J to 96J fail to check those on the line 24B to 25B by 15 fathoms. They are also about 15 fathoms shoaler than those on the line 76B to 79B, which it closely parallels. Since the soundings between 93J and 96J were obtained by the white light method on the oscillator type fathometer, it is recommended that they be rejected. *Sdgs from 93J to 96J are evidently erroneous*

A note in the sounding volume at position 96A states that the initial flash of the fathometer had slipped, making soundings 5 fathoms too deep. The hand lead comparisons at the end of the line confirm this correction. The sounding line from 65A to 75A closely parallels the line from 110B to 97B. All soundings on line 65A to 75A are 4 fathoms deeper than those on line "B". This would indicate that the correction noted at 96A extends back on the line to these positions also. (The soundings from 65A to 77A are therefore corrected 4 fathoms. The soundings between 77A and 96A were taken with the other fathometer (oscillator type) and are not subject, therefore, to this correction.) *This correction was applied in sdg. vol. from 65A to 77A and 96A to 110A*

BOTTOM

The bottom in this area is quite even, sloping moderately from the 20 fathom curve to the 50 fathom curve. From the 50 fathom curve the slope increases to the outer limit of the work. In the shoaler area the bottom consists of fine gray sand and broken shell, and in the deep sea area it consists of gray or green mud.

G.R.

CURRENTS

Current observations were taken at depths of 20, 30, 50, and 100 fathoms several times during the season. The strengths of current and directions so obtained were considered to exist in all similar depths. In running dead reckoning lines the correction to course for currents depended upon the depth beneath the ship.

There were indications that the edge of the Gulf Stream shifted landward or seaward at various times, but not enough data was obtained to consider this in plotting the precise dead reckoning lines.

COMPARISON WITH PREVIOUS SURVEYS

The southern limit of this work overlaps that of the Steamer RANGER, season of 1930. There are no marked discrepancies in the soundings.

The northern limit of the work overlaps that of the Steamer LYDONIA, season of 1930. There were no marked discrepancies in the soundings.

SYMBOLS

The factors determining sounding line positions on the hydrographic sheet are represented by various colors, as follows:

Course steered-----	Black
Current-----	Red
Adjustment for closure-----	Blue
Final adjustment-----	Green
Bomb arc-----	Brown
Visual bearings-----	Violet (full line)
Radio Compass bearings-----	Violet (broken line)
Hydrographic buoys-----	Blue
Bridge of the station ship-----	Green
Hydrophone-----	Brown

LOOP ADJUSTMENTS

An abstract of loop adjustments is attached to this report.

5

ADDITIONAL INFORMATION

The descriptive reports covering sheets #1 and #2, and the report on corrections to fathometer soundings, Steamer LYDONIA, season of 1931, give additional information concerning this work.

Respectfully submitted,

L. S. Hubbard
L. S. Hubbard, H. & G. Eng'r.

LOOP ADJUSTMENTS.

Adjustment "A" Day

A dead reckoning loop was run from the fixed position 7A to 63A and the closure adjusted proportional to the log run. Bomb distance 13A checked the D.R. 13A and this was held fixed. Bomb distances 47A and 49A were .8 mile further east than the dead reckoning positions of these points. The D.R. positions were shifted to correspond to the bomb distances. This put 46A close to the radio bearing at this position. This shifting was adjusted back to 13A proportional to the distance.

The bomb distance and visual bearing at 60A was held correct and the D.R. position shifted to it. The line between 49A and 60A was shifted proportionally to fit the bomb distance fixes. The line between 60A and 63A was shifted to fit the bomb distance and bearing fixes of these points.

A dead reckoning loop was run from the fixed positions 70A to 110A. Positions 71A, 74A and 75A were determined by bearings and bomb distances. The line between 71A and 74A was shifted to fit the controlled positions of 71A and 74A. Bomb distances on positions 94A, 96A, 97A, 99A, 101A and 103A were all further east than the D.R. positions. Bearings at 105A, 106A and 107A were north of the D.R. positions. The line between 94A and 110A was therefore shifted north and east to fit the bearings and bomb distances as closely as possible. The positions between 75A and 94A were shifted proportional to the distances to both 75A and 94A.

Adjustment "B" Day

The loop from 9B to 40B was run by D.R. and adjusted. The bomb distance to 10B was .2 mile greater than the D.R. position. The bomb distance to 39B was .2 mile less than the D.R. position. Since both are adjacent to fixed positions, the D.R. positions are considered more reliable, and the bomb distances are rejected. Bomb distance 34B is also .2 mile less than the D.R. position. It is also rejected. *Bomb distances not used by field party.*

The loop from 62B to 104B was run by D.R. and adjusted. The bomb distances to 62B, 105B and 108B were greater than the distances to the fixed positions. Bomb distance 101B checked closely; no adjustment was made for the bomb distances.

Adjustment "F" Day

The positions 10F and 58F were held fixed, and the dead reckoning loop between adjusted to these positions. The radio bearings were not considered accurate. Visual bearings at 54F and 56F differed slightly from the adjusted D.R. positions, 54F being above the line and 56F below the line. The D.R. positions were therefore held.

In the loop from 68F to 127F the D.R. closure was adjusted and held. It was not adjusted to the radio bearings because they were not consistent, radio bearings on 96F and 104F being north of D.R. positions, and 113F being south of the D.R. position. The radio bearing on 120F checked the D.R. position of 120F.

The bomb distance 69F checked the D.R. position. Bomb distances on 123F and 127F were close to the D.R. positions, the bomb distance on 124F being a little too far and that on 127F a little too short. The D.R. positions were therefore used.

The dead reckoning loop was adjusted between 139F and 204F. Radio bearings plotted both north and south of the dead reckoning, indicating large uncertainty. They were not used in adjusting the line.

The bomb distance 147F checked D.R. position 147F. Bomb distances 193F, 198F and 200F checked the D.R. positions of these points. They were held. Bomb distances 189F, 192F, 194F and 197F were short of the D.R. positions. They were not consistent with the other three and were rejected.

Adjustment "H" Day

After adjusting the loop from 73H to 140H for closure, a second adjustment was made from 83H to 136H so that the radio bearings on 96H and 108H and the visual bearings from 127H to 136H came closer to the corresponding positions, and so that bomb distances 127H checked closer to this position.

The loop from 93H to 123H was shifted as a whole, .52 mile, 36° true. The shift at 93H was distributed back to 83H proportional to the distance. The shift at 123H was distributed to 138H also making added shifting to give weight to the visual bearings on the included positions. This shift improved the crossings near 115H and 120H considerably, and made a smoother 100 fathom curve.

On the line from 73H to 134H, bearing 89H is 0.7 miles north of D.R. 89H, bearing 96H (not too reliable) is about 0.4 miles north of D.R. 96H, and 108H is about 0.4 miles north of D.R. 108H, corrected for closure. Using 96H and 108H, the line from 73H to 117H could be shifted 0.4 mile north.

Visual bearings 124H to 136H are about 0.4 mile north of D.R. positions, agreeing with the previous indications.

Bomb distance 123H checks D.R. position 123 H, but bomb 127H indicates that the D.R. position 127H is too far west. Bomb distance 123H was originally held since it checked D.R. position 123H, but by holding that position the crossings fail to check at 120H and 113H.

It is suggested that since the soundings at these crossings are more liable to be correct on position 50H and 60J, that the line near positions 113H and 123H be shifted out to check the crossings. This means to move 123H east about 0.4 mile.

To make these two shifts - north 0.4 mile and east 0.4 mile - there is the following evidence: bearings 96H and 108H, bomb distance 127H, and two crossings of probably better controlled lines. Against this shift are the following: bearing 89H, bomb 123H, and the original adjusted D.R. position 123H, the principal objection to the shift being D.R. position 123H and bomb distance 123H. Bombs on the whole have been quite unreliable and except for bomb 123H there would be no hesitancy in making the recommended shift.

Adjustment "J" Day

The first loop of the day was adjusted, holding positions 6J and 28J fixed. Visual bearings from 19J to 25J indicated the ship's position to be north of the adjusted line. The line was swung north so that 19J plotted on its bearing. The shift was distributed back on the line to 13J.

The closure on the loop from 40J to 124J was large. Its crossings on other lines indicated that an even distribution of the closure did not distribute the error in position to the proper places. The line was therefore further shifted as follows:

From 45J to 52J the line was spread .4 mile. From 52J to 66J the line was shifted in azimuth slightly anti-clockwise. The line from 67J to 70J was spread 0.3 mile, holding 70J fixed. Position 98J was shifted 0.6 mile eastward and the closure distributed back over the line to 70J. The line from 98J to 110J was shifted 0.6 mile eastward. It was also spread 0.5 mile on its northern half. The line from 110J to 124J was shifted north and spread 0.5 mile to fit the visual bearings from 118J to 124J. This improved the crossings considerably. If stronger currents than usual existed on this day the above shifts are justified.

Adjustment "K" Day

The loop from 7K to 22K was first adjusted for closure in D.R. run. The bearing at 21K was close to the adjusted position, but was considered too far from the buoy to be given greater weight than the D.R. position. The bearing at 20K was farther away and was considered wild.

In the loop from 42K to 61K the bearings at 56K, 59K and 60K all gave a position of the ship back on the line from the adjusted D.R. positions. The positions from 61K to 50K were therefore shifted back a distance proportional to the log distances.

Statistics for Sheet No. 3

Ship LYDONIA

*Don't find any hand
lead Sdgs. on B day
Prob. means tube
sds R*

Volume	Date 1931	Day	No. of Miles Statute	No. of Soundings		No. of Positions	No. of Angles
				Fathometer	Hand Lead		
1	2-24	A	106.3	430		110	33
1	3-6	B	124.4	342	16	110	71
1	3-7	C	6.0		13 (tube)	5	9
1	3-8	D	12.3	77		27	25
2	3-10	E	31.0	160		55	95
2	3-11	F	169.0	709		204	59
2-3	3-12	G	104.2	349		111	128
3	3-13	H	122.9	527		141	55
3	3-14	J	106.5	485		125	44
3-4	3-25	K	35.0	182		66	61
TOTALS			817.6	3261	16	954	580

Area Surveyed

3725 Square Miles (Statute).

LOCATION OF HYDROGRAPHIC SIGNALS

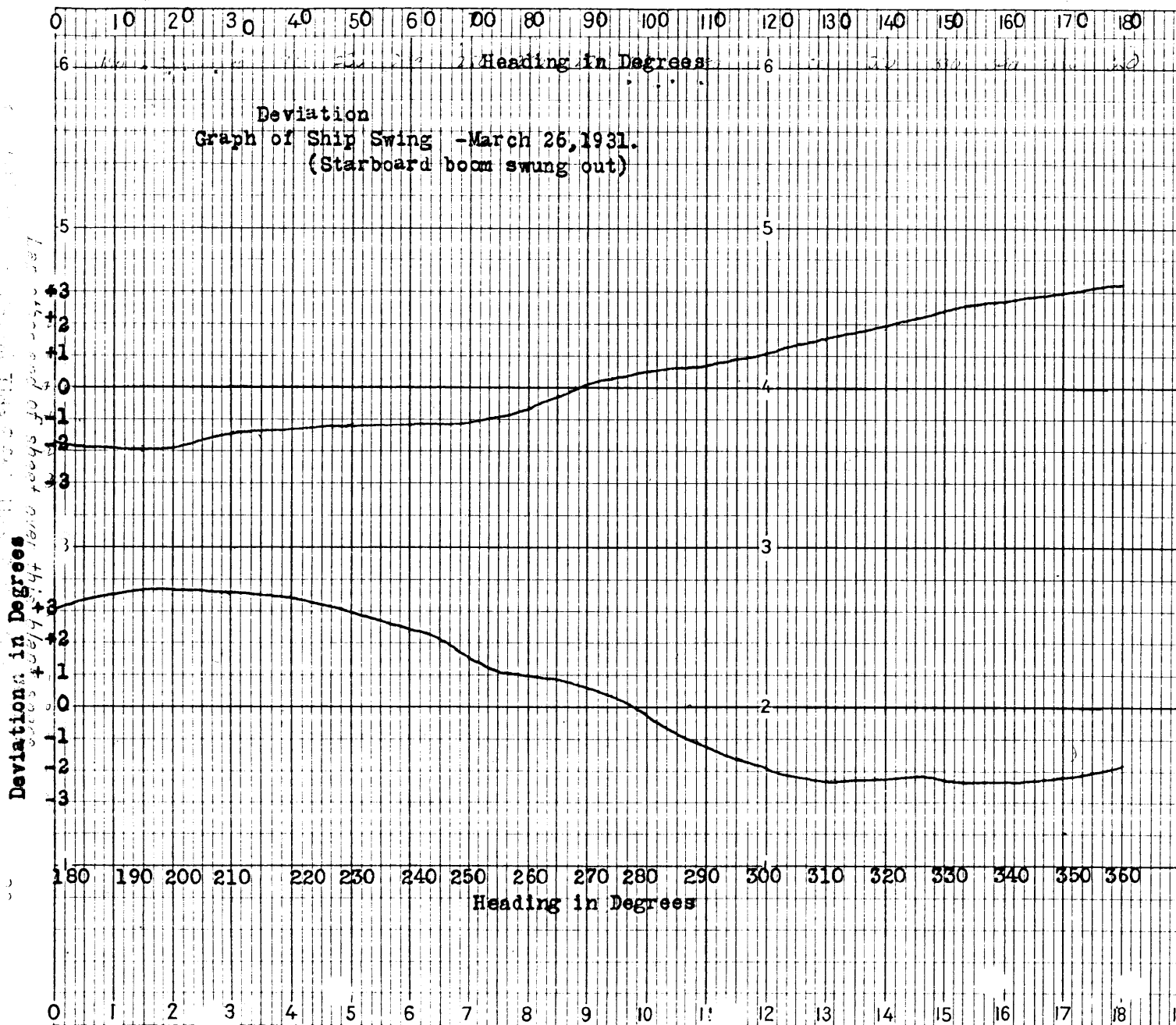
SHEET No. 3

Florida - 1931

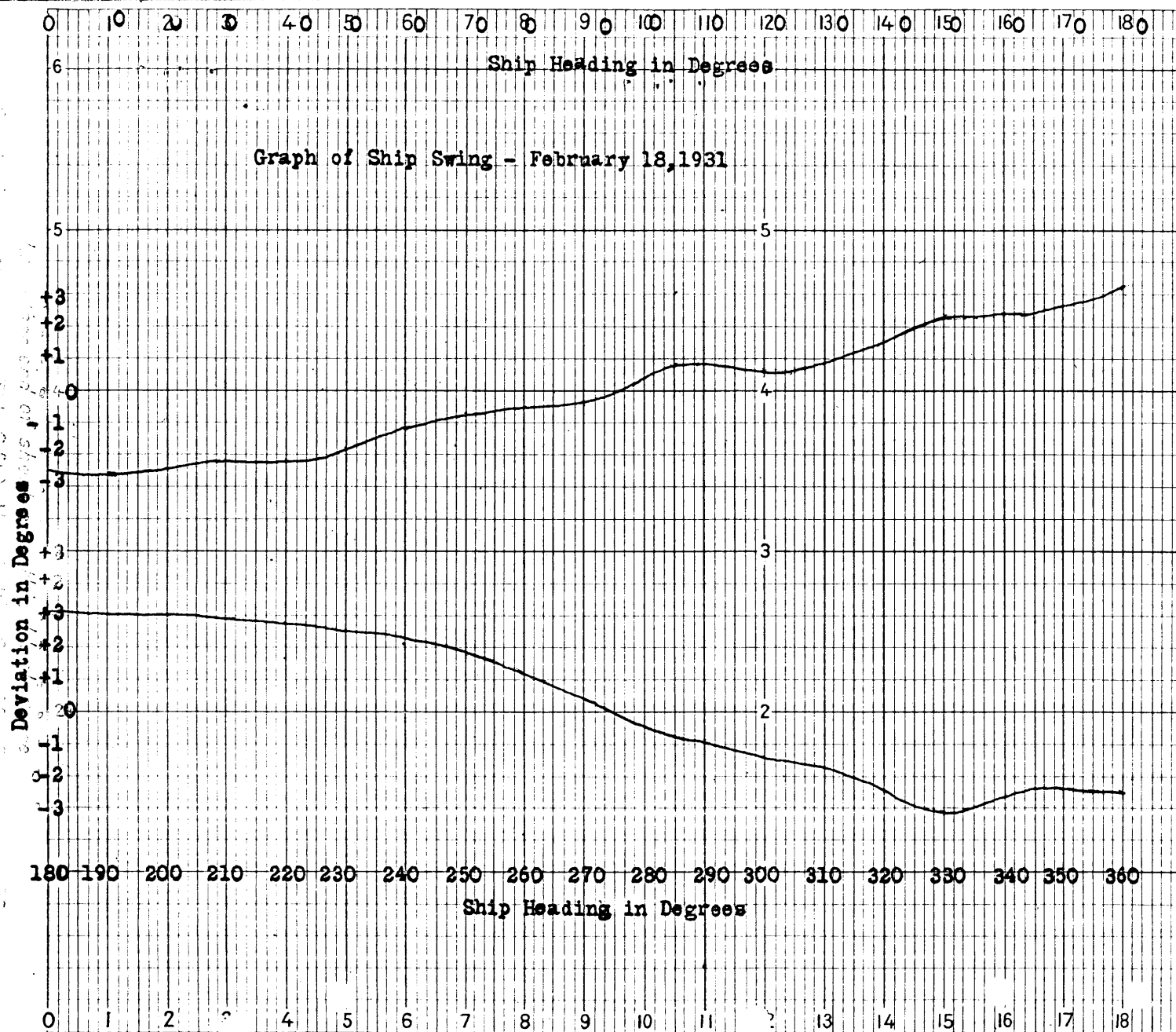
Scale 1/120,000.

Signal	Latitude			Longitude		
	Degrees	Minutes	Meters	Degrees	Minutes	Meters
WAKE	28	31	1207	80	08	664
XTRA	28	28	1495	80	08	878
YAWL	28	25	1752	80	08	936
ZERO	28	23	435	80	08	638
ARAB	28	20	1211	80	08	508
BACK	28	18	292	80	08	654
BAIN	28	18	164	80	08	640
BLOW	28	15	936	80	08	666
CARD	28	12	1508	80	08	800
DROP	28	09	1154	80	08	714
EMMA	28	06	1088	80	08	505
EDEN	28	06	336	80	11	880
FOUL	28	03	1665	80	08	417
GOOD	28	01	478	80	08	345
HARD	27	58	1096	80	08	132
IZZY	27	55	1583	80	07	1565

Deviation
Graph of Ship Swing - March 26, 1931.
(Starboard boom swung out)



Graph of Ship Swing - February 18, 1931



2 23 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 19 20 21 22 23

Bearings in Degrees

CORRECTIONS TO RADIO COMPASS BEARINGS
February 24, 1931.
Str. LYDONIA

Corrections in Degrees

+10
8
6
4
2
0
-2
-4
-6
-8
-10
+10
8
6
4
2
0
-2
-4
-6
-8
-10

5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10

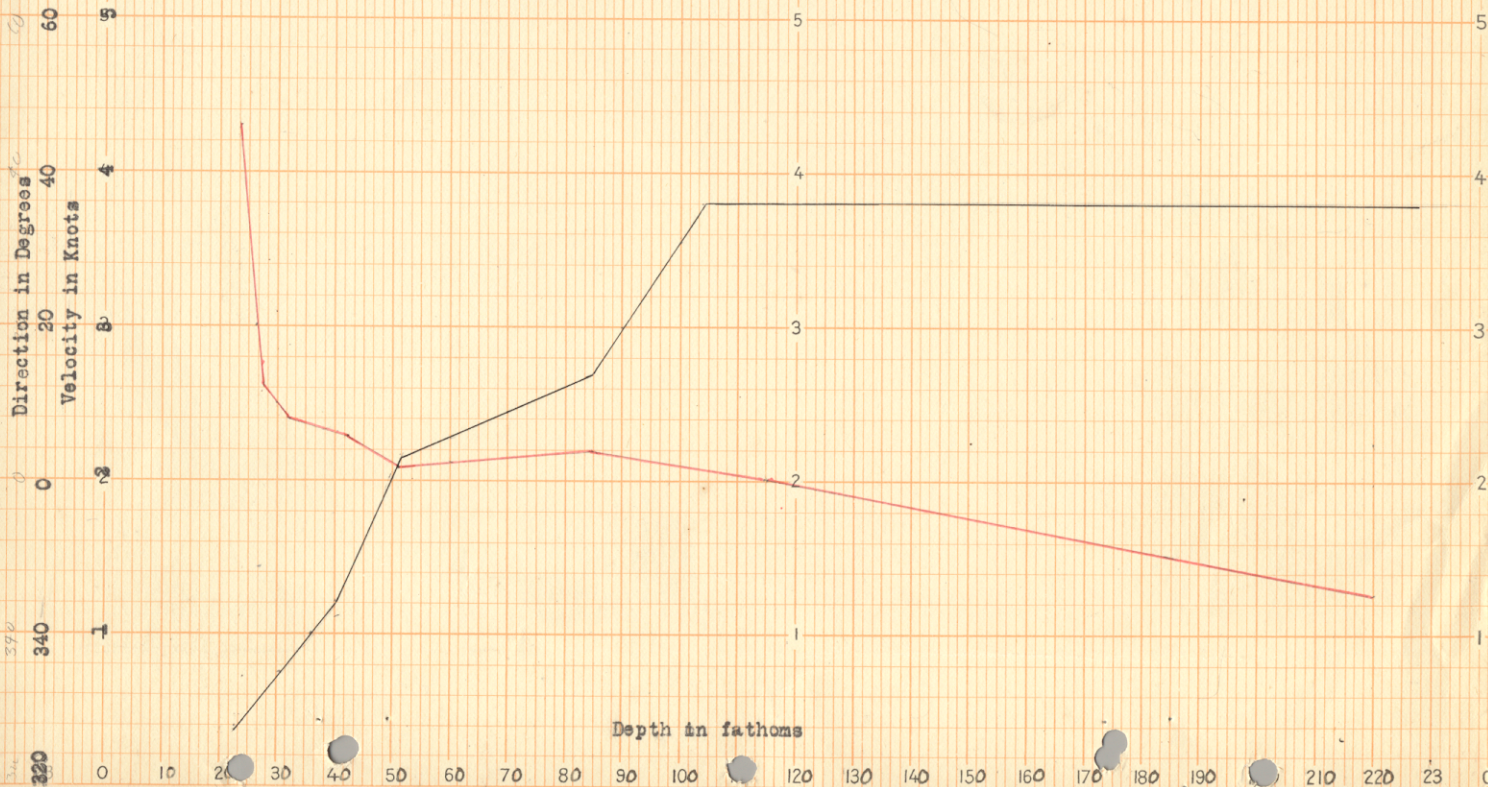
180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360

Bearings in Degrees by Direction Finder Compass

2 23 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

CURRENTS EAST COAST OF FLORIDA

Black Lines represents the velocity of current
Red Line represents the direction on current



March 8, 1932.

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in
4 volumes of sounding records for

HYDROGRAPHIC SHEET 5138

Locality Southeast of Cape Canaveral, Florida, East Coast

Chief of Party: G. D. Cowie in 1931

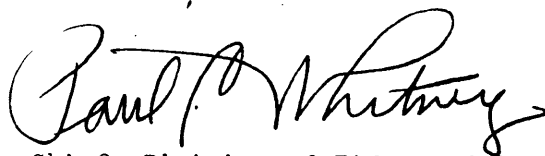
Plane of reference is mean low water, reading

-0.1 ft. on tide staff at Cape Canaveral

11.1 ft. below B. M. 1

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.



Chief, Division of Tides and Currents.

NOTE: For the area covered by this sheet the tides were considered to occur 40 minutes earlier up to depths of 24 fathoms, and 58 minutes earlier from 24 fathoms to 100 fathoms, than those recorded at Canaveral Harbor, and to be of the same range.

Section of Field Records
Report on Hydrographic Sheet H-5138
Southeast of C. Canaveral, East Coast
of Florida.
Surveyed in 1931. Instructions dated
January 5, 1931 (Lydonia).

Surveyed - G. D. Cowie
Chief of Party - G. D. Cowie
Protracted by L. S. Hubbard
Soundings plotted by L. S. Hubbard
Verified and Inked by G. Risegari

1. The work conforms to the requirements of the General Instructions, except no bottom characters were entered in the volumes and it is not known where such data was kept in order for the field party to write them on the sheet. The descriptive report, page 3, contains a general description of the bottom.
2. The plan and character of development fulfill the requirements of the General Instructions.
3. The plan and extent of development satisfy the Specific Instructions. Exceptions: (a) Failure to develop an indication of a submarine valley in the vicinity of lat. $28^{\circ}26'$ long. $79^{\circ}56'$, as requested in paragraph 7 of the Specific Instructions. It is regrettable that the line of soundings running north and south on "J" day in depths of about 85 fathoms was not run closer to the 100 fathom curve which would have been invaluable in determining whether or not the valley really exists. (b) Failure to run additional lines in conformity to the required spacing inside the 100 fathom curve, vicinity of lat. $28^{\circ}38'$, long. $80^{\circ}05'$.
4. The sounding line crossings are in good agreement. Where no crossings were made the work in general, from the study of the parallel lines, appears to be quite satisfactory taking into consideration the scale and the type of surveying.
5. The usual depth curves can be completely drawn on the sheet.
6. Junction with H. 5029 (south) is satisfactory.
Junction with H. 5116 (southwest) is satisfactory.
Junction with H. 5120 (west) is satisfactory
Junction with H. 5034 (west) shows in several places, discrepancies of as high as ten feet between the adjacent sheets and it was believed by Mr. A. L. Shalowitz best not to transfer the adjacent work on H. 5034. The matter was considered to be a cartographic problem and would be taken up by the cartographer in the compilation of the charts, which will show soundings in different units and scales for this area.

It is believed the discrepancies are largely due to the

signal "Echo" on H. 5034 which was originally plotted on the sheet by Capt. Cowie and checked by Mr. Malnate. The original plotting does not agree, however, with numerous bearings from different positions on the sheet, but the bearings do agree with the new position plotted by Mr. Fleming of the Field Records Section.

It was found that if the bearings were applied to the original position of "Echo" the adjacent soundings in question would make a more reasonable agreement with those of H. 5138.

The work of H. 5138 is controlled in this area by three point fixes on floating signals and from the results of the study of the index fathometer corrections, tide reducers, plotting, etc., the work appears unimpeachable.

Junction with H. 4931 (north) is satisfactory.

7. In consideration of the excellent control of the work on H. 5138 and of the improved methods of modern surveying it is recommended that the work of H. 5138 supersede the work on all the old sheets covering the same area.

8. Reviewed by G. Risegari - May 10, 1932.

App. A. M. Sobieralski

Memorandum by A. L. Shalowitz.

1. Referring to paragraph 3 of Review.

The numerous fathometer misses between 49 and 53A would tend to cast some doubt on the preceding soundings but a close study of the entire line and the adjacent lines leads to the conclusion that there is a strong probability that the submarine valley does exist.

2. Referring to paragraph 6 of Review.

The location of signal "Echo", while somewhat doubtful, has been accepted as revised by Mr. Fleming because it seemed to agree more with the various factors entering into its determination than did the position as originally plotted on the smooth sheet.

3. Sheet Inspected and recommendations approved.